

1. An array of micro-optical components comprising;
at least two micro-optical components, each micro-optical component comprising

a refractive surface created to have a designed optical performance, and

a corresponding compensation surface for said refractive surface, said
corresponding compensation surface including a corresponding compensation
feature when said refractive surface deviates from the designed optical
performance, said micro-optical component providing the designed optical
performance,

at least two refractive surfaces of the array of micro-optical components being
formed to have the designed performance, the array of micro-optical components
including at least one corresponding compensation feature, at least two compensation
surfaces of the array of micro-optical components being different from one another,
wherein at least two combinations of refractive surfaces and corresponding
compensation surfaces operate at different focal lengths.

2. The array of claim 7, wherein all combinations of refractive surfaces and
corresponding compensation surface operate at a same focal length.

3. The array of claim 7, wherein at least two combinations of refractive surfaces
and corresponding compensation surfaces operate at different focal lengths.

4. The array of claim 1, wherein said at least two refractive surfaces and said
corresponding compensation surfaces are formed on a same substrate.

5. The array of claim 1, wherein said at least two refractive surfaces and said
corresponding compensation profiles are formed on different substrates of at least two
substrates bonded together.

6. The array of claim 1, wherein corresponding compensation features correct for
aberrations in a corresponding refractive surface.

7. An array of micro-optical components comprising;
at least two micro-optical components, each micro-optical component comprising

5 a refractive surface created to have a designed optical performance, and
a corresponding compensation surface for said refractive surface, said
corresponding compensation surface including a corresponding compensation
feature when said refractive surface deviates from the designed optical
performance, said micro-optical component providing the designed optical
10 performance,

at least two refractive surfaces of the array of micro-optical components being
formed to have the designed optical performance, the array of micro-optical
components including at least one corresponding compensation feature, at least two
compensation surfaces of the array of micro-optical components being different from
15 one another, wherein corresponding compensation features comprise a corresponding
separation of the corresponding compensation surface from the refractive surface in
accordance with an intended focal length of the combination of the refractive surface
and the corresponding compensation surface.

20 8. The array of claim 7, wherein corresponding separations are also formed in
accordance with a measured focal length of a corresponding refractive surface.

9. The array of claim 1, wherein a desired focal point of the micro-optical
component is on a back surface of a substrate on which said at least two micro-optical
25 components are formed or on a substrate bonded thereto.

10. An array of micro-optical components comprising;
at least two micro-optical components, each micro-optical component comprising

30 a refractive surface created to have a designed optical performance, and

a corresponding compensation surface for said refractive surface, said corresponding compensation surface including a corresponding compensation feature when said refractive surface deviates from the designed optical performance, said micro-optical component providing the designed optical performance,

at least two refractive surfaces of the array of micro-optical components being formed to have the same designed optical performance, the array of micro-optical components including at least one corresponding compensation feature, at least two compensation surfaces of the array of micro-optical components being different from one another, wherein corresponding compensation features include a diffractive element.

11. The array of claim 10, wherein the diffractive element corrects for aberrations in a corresponding refractive surface.

12. A method of forming micro-optical components having a desired optical performance comprising:

creating a plurality of refractive surfaces on a substrate, each refractive surface created to have a designed optical performance;

providing a corresponding plurality of compensation surfaces, one for each refractive surface;

measuring an optical performance of at least one refractive surface of said refractive surfaces;

comparing measured optical performance with the designed optical performance;

forming a compensation profile on a compensation surface when a corresponding refractive surface deviates from the designed optical performance;

creating refractive surface-compensation surface pairs, each pair having the designed optical performance; and

separating the plurality of pairs into at least two micro-optical components, each micro-optical component including a refractive surface and a compensation surface.

- 5 13. The method of claim 12, wherein said separating creates a plurality of pairs.
14. The method of claim 12, wherein said separating creates at least one array of pairs.
- 10 15. The method of claim 12, wherein said forming of compensation features includes forming compensation features on the substrate on which the plurality of refractive surfaces have been formed.
16. The method of claim 12, wherein said forming of compensation features
15 includes forming the compensation features on a different substrate than the substrate on which the plurality of refractive surfaces have been formed, the method further comprising bonding the substrate having the compensation features and the substrate having the plurality of refractive surfaces.
- 20 17. The method of claim 12, wherein said forming of compensation features includes etching the substrate in accordance with a designed focal length of the micro-optical component.
18. The method of claim 17, wherein said etching results in different focal lengths
25 for at least two of the micro-optical components.
19. The method of claim 12, wherein said forming of compensation features includes etching the substrate in accordance with a measured focal length of the corresponding refractive surface.

20. The method of claim 12, wherein said forming of compensation features includes etching using a single mask to simultaneously create a pattern for all of the compensation features.

5 21. The method of claim 12, wherein said forming of compensation features includes etching using a single mask to create a pattern for the compensation features, the single mask being moved to create the pattern for the compensation features.

10 22. The method of claim 12, wherein a desired focal point of the micro-optical components is on a back surface of a substrate on which said at least two refractive surfaces are formed or on a substrate bonded thereto.

23. The method of claim 12, wherein said forming of compensation features includes forming a diffractive element.

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24. The method of claim 12, wherein said forming of compensation features includes creating at least two corresponding compensation features for different compensation surfaces that are different from one another.

20 25. The method of claim 12, wherein said creating of the plurality of refractive surfaces includes using the same process for all of the refractive surfaces.

26. The method of claim 12, further wherein said measuring of optical performance includes measuring optical performance for each refractive.

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27. The method of claim 12, further wherein said measuring of optical performance includes measuring optical performance for a subset of said plurality of refractive surfaces.